

Excess Enthalpies of Binary Mixtures Containing 2-Pentanol + Hydrocarbons for the Characterization of Second Generation Biofuels

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The use of biofuels is increasing in the EU with the target of decreasing dependency on petroleum, and also to reduce CO₂ emissions and to support the agricultural community. There is a wide variety of biogenic products that can be added to fuels, and the quality of these products becomes more important, requiring an accurate knowledge of the thermodynamic properties of the new fuel blends. The 2-pentanol is considered an alcohol of the second generation of biofuels. It has some advantages in comparison with ethanol such as a lower vapour pressure and higher heating values, quite similar to the gasoline. Excess enthalpies have been measured with a quasi-isothermal flow calorimeter, developed in our laboratory [1]. It is based on the accurate measurement of the energy required to maintain the mixing vessel at a constant temperature. To achieve this condition, a Peltier cooler removes, at constant rate, energy from the flow cell, and a control-heater compensates for this energy and additionally the energy liberated (exothermic mixing) or absorbed (endothermic mixing) by the mixing process. In this work the experimental values of the excess enthalpies for the binary mixtures containing 2-pentanol and hydrocarbons as heptane, 1-hexene and 1,2,4-trimethyl benzene at 25°C and 40°C and atmospheric pressure are reported, and the behaviour is discussed.

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[1] J.J. Segovia, M.C. Martín, D. Vega-Maza, C.R. Chamorro, M.A. Villamañán, J. Chem. Thermodyn. 41 (2009) 759-763.